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SEPTEMBER 4, 1948

TECHNOLOGY DEPARTMENT

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

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VOL. 54 NO. 10.

MEDICINE

Find New Clotting Factor

Fifth substance necessary to produce clotting has been found in blood. It is a protein which has already been successful against a rare bleeding disease.

➤ A NEW PROTEIN which plays an important role in clotting has been discovered in blood.

The new blood-clotting factor was described to the International Society of Hematology meeting in Buffalo, N. Y., by scientists from this country and Norway.

Dr. Paul A. Owren of the University of Oslo, Norway, reported that he found the protein in 1944. He called it the fifth coagulation factor. Working independently last year, American scientists located the clotting factor and termed it ac-globulin. The "ac" is for accelerator, because it is one of the triggers that sets in motion the clotting process.

Four previously known substances are all necessary to produce clotting in blood. Prothrombin, a blood protein, must be activated by thromboplastin, a substance present in tissues, and calcium to form thrombin. Thrombin is the intermediate substance that acts on fibrinogen, the fourth factor necessary in coagulation to form the blood clot.

How ac-globulin, the new fifth blood-clotting factor, helps produce prothrombin was explained by Drs. Walter H. Seegers and Arnold G. Ware of the Wayne University College of Medicine, Detroit.

Their work has been aimed at isolating the new factor in pure form in a laboratory test tube. Although it is difficult to separate, they said that they are very near to getting the substance in purified form.

The Norwegian scientist who first discovered the new protein reported that he has successfully treated one patient with it.

Dr. Owren said the patient came to his hospital clinic with a very rare bleeding disease which the Norwegian doctor calls parahemophilia. After treatment with this new clotting factor, supplied from normal human plasma, the patient was relieved of her bleeding tendency.

Because the disease is so rare, physicians here said that at present they have no way of knowing how often it might occur. Only a few cases have been reported in the U. S.

Usefulness of the new factor in dicumarol treatment was investigated by Dr. John H. Olwin of the University of Illinois College of Medicine, Chicago.

Dicumarol is the anti-blood-clotting drug that comes from spoiled sweet clover. It is used for treatment of certain heart conditions where there is a tendency for the blood to clot in the veins.

Dr. Olwin said that ac-globulin appeared to have only minor importance in this type of treatment. But he described a new two-stage method which he has developed for safer handling of patients on dicumarol.

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MEDICINE

Infantile Blood System

The atomic bomb will reduce your blood-forming system to an embryonic state in first few months after radiation exposure, study indicates.

➤ THE ATOMIC BOMB will make a baby of you, not through fear alone but by its effect on your blood-forming system, the International Society of Hematology was told in Buffalo.

This picture of how a lethal dose of radiation will convert your blood system to an embryonic state was presented by Col. Elbert DeCoursey of Brooke General Hospital, San Antonio, Texas.

Col. DeCoursey made his study from material he picked up at Nagasaki and Hiroshima while a member of the Joint Commission for the Study of the Effects of the Atomic Bomb.

From this he made the unexpected discovery that when the cells in the bone marrow attempt to regenerate after killing doses of radiation, they make plasma cells. These cells are of the same type as the cancerous lesions in multiple myelomas.

Col. DeCoursey described the blood picture as follows:

Lymphocytes, white blood cells from lymph glands, decreased within 48 hours, reaching their lowest peak after four weeks. They returned to normal in 12 weeks in the patients who lived.

Granulocytes, white blood cells from bone marrow, also decreased within 48 hours, reaching their lowest number within four weeks, but they returned to normal within eight to nine weeks.

Red blood cells decreased drastically some time during the first week, reaching the lowest point within six to eight weeks. They took the longest time to get back to normal—14 weeks.

In the first stage then, the blood cells which usually formed in the bone marrow disappeared. However, some radiation-resistant cells, called histoblasts, remained. These are the young cells, originators of all the cells that are found in the blood.

These multiply and within eight weeks the whole bone marrow becomes filled with young blood cells. However, there is a catch to this happy state of affairs. The cells don't grow up but remain in their baby state.

At this point transfusions are needed to tide the patient over into the third month when the blood-forming system reasserts itself and cells begin to mature.

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PUBLIC HEALTH

Proportion of Babies Born In Hospitals Increases

➤ A LARGER PROPORTION of new babies in 1946 were born in hospitals than ever before, figures compiled by the National Bureau of Vital Statistics revealed.

From 1935 to 1946 the number of hospital births jumped from 36.9% to 82.4% of the total births. In 1935, 50.6% of the registered live births were attended outside hospitals by doctors, and 12.5% were attended by mid-wives and others. In 1946, only 12.2% of births were handled outside hospitals by doctors. Only 5.4% were attended by persons outside the medical profession.

While almost all the white births were attended by physicians, for non-white births less than two out of three had physicians present and slightly less than half occurred in hospitals.

There was also a difference between births in urban areas and in rural areas. For city dwellers 92.5% of the registered live births took place in hospitals, compared with 67.1% for country dwellers.

Science News Letter, September 4, 1948

ELECTRONICS

Flawless Glass Produced By Electric Heating

➤ FLAWLESS GLASS by an electrical heating process is now being produced, using electrical equipment developed by General Electric, it was revealed. The electric current, passed through the glass, is converted into heat by the resistance of the material much as it is in the heating element in ordinary heaters.

Glass melting with electricity has been practiced in Europe for a number of years, but the product frequently was discolored or contained air bubbles. With the new American process these faults do not result and the product is glass of the highest quality. When the glass is melted, it can be poured and molded into desired shapes.

Science News Letter, September 4, 1948

BIOCHEMISTRY

Proteins Make Vitamins

Experiments with rats revealed that proteins are increased when they are set free from vitamin-building. Discovery may aid in disease-fighting.

➤ THE BODY may be able to manufacture some vitamins from proteins if it does not get enough vitamins from food, the International Society of Hematology was told in Buffalo.

Discovery that some vitamins can be made from proteins was made in experiments with rats, but the findings may apply to humans, Dr. Floyd S. Daft of the National Institutes of Health, Bethesda, Md., declared.

Dr. Daft found that if there are not enough vitamins and amino acids, chemical building blocks of proteins, in the diet of rats, they develop blood disorders. The nutritional anemia may be caused by a shortage of protein material to manufacture the missing vitamins, Dr. Daft suggested.

Rat experiments indicated that a diet slightly deficient in tryptophane, an amino acid, produced a shortage of the vitamin, folic acid. When the rats were treated with either of two vitamins, niacin or folic acid, they recovered from the anemia.

When the vitamin was given the rats, Dr. Daft said, it seemed to increase the supply of protein, because the protein was no longer used in vitamin-building.

Rats put on a diet in which casein, the principal protein in milk, was the only protein, showed growth failure and frequently developed blood disorders. Adding three protein-building amino acids to the diet prevented this condition from developing.

But after the blood condition had developed, one or more other substances such as amino acids, folic acid or purified liver extract were generally needed.

Thus, Dr. Daft concluded, vitamins can help correct a protein deficiency, while proteins will aid in building up the supply of vitamins.

If a diet is low in protein, there will develop shortages of both vitamins and nucleic acids, the basic substance in the nucleus of a cell.

The findings with rats may apply to humans, Dr. Daft said, because both rats and humans respond to the same treatments with vitamins for certain types of anemia. Folic acid and the new vitamin, B-12, correct these anemias in both, it was found.

How sulfa drugs work in the body may be explained further by discovery of this interchange between vitamins and proteins, the scientist indicated. Dr. Daft previously found that sulfa drugs cause anemia and destruction of white blood cells in rats. His new experiments have led him to believe that sulfa drugs may create an amino acid shortage in the body.

Science News Letter, September 4, 1948

New Hereditary Disease

➤ A NEW hereditary bleeding disease which strikes infants was reported to the society by two French doctors, Jean Bernard and J. P. Soulier, both of Paris.

Hemorrhages began in 15-day-old babies. In some cases two or three children in the same family were affected. Blood vessels under the skin and the membranes lining the body organs hemorrhaged, and one of the infant victims vomited blood.

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PSYCHOLOGY

Fourth of Veterans Found Mistaken in Job Choice

➤ ONE of every four veterans who came to a vocational guidance center was found to have mistaken ideas about what sort of job he should try to get, a survey has revealed.

Some of them aimed too high for their intelligence or abilities. Some had school records which did not justify the choice they made. Others were handicapped by personality maladjustments, physical disabilities or lack of money to finance their training.

A study of the job choices of 224 veterans is described by Joseph Stubbins of Columbia University in the journal, OCCUPATIONS (April).

Six of every ten veterans made appropriate choices, while approximately one in every ten was unable to suggest a suitable job for himself.

Only 3.6% of the group aimed too low in their vocational choices.

The more educated veterans did a better job of selecting an occupation, it was discovered. Pensioned veterans made reliable choices. Those who came for guidance voluntarily needed more help, because they tended to make less realistic choices.

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ARCHAEOLOGY

Earliest American House May Have Been Found

➤ AMERICA'S OLDEST HOUSE, with a possible age ranging from 10,000 down to 3,000 years, may be represented by an enclosing rectangle of post-holes discovered near Little Lake in Inyo County, Calif., by an expedition from the Southwest Museum in Los Angeles. Actual find was made by a volunteer amateur archaeologist, B. E. McGown of San Diego.

There are 23 holes, averaging four inches in diameter, outlining what seems to have been a crude hut about eight by 12 feet in

AMERICA'S OLDEST HOUSE—These post-holes discovered near Little Lake in Inyo County, Calif., may date anywhere from 10,000 years to 3,000 years ago.

size. The posts stood upright, so it is assumed that they supported a roof. No hearth has been found in the enclosure, but near the southwest corner is a depression containing many charred and split bones of food animals. The floor was of packed earth.

M. R. Harrington, curator of the Southwest Museum, who was in charge of the expedition, states that the dwelling may date from shortly after the close of the Ice Age. Stone spear or dart heads of the type recently named Pinto Basin culture were found in and near the old house site, so there is no doubt that Pinto Basin man built and lived in the hut.

Date of the Pinto Basin culture, first discovered near Twentynine Palms, Calif., by Mr. and Mrs. W. H. Campbell, has not yet been established. Estimates range from as recent as 1,000 B. C. to as ancient as 8,000 B. C.

Earliest American habitations, aside from caves, are pit dwellings dating from the earlier centuries of the Christian era, when the Basketmaker culture flourished in the Southwest.

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GENERAL SCIENCE

SNL on News Stands Of New York City

➤ WHEN YOU ARE in New York City you may now buy the SCIENCE NEWS LETTER each week on many of the news stands of the metropolitan area. Look for it and tell your New York friends about it.

Science News Letter, September 4, 1948

INVENTION

Salt in Auto Tire Helps Prevent Skidding on Ice

➤ SALT in an automobile tire is the newest aid suggested for driving on icy streets.

The salt is not just added to the tire. It is scattered within a new material developed for recapping worn tires. The material, developed by the United States Rubber Company, is called "Wintrac."

This new recapping material consists of a high quality tread stock into which thousands of pieces of rock salt have been mixed. As the tread wears down, the pieces of salt are released to form surface pores which grip the road.

Science News Letter, September 4, 1948

Letters To The Editor

Biggest Ever

Your item (SNL, Aug. 21) about big hailstones reminds me of some in Cincinnati, Ohio, about 1900. Major Bixby (afterwards Chief of Engineers, U. S. Army) stared at them in astonishment, called a cab, then took off his coat and bundled up the biggest ones in it. These he rushed to an engineer friend at the cold-storage plant to be preserved as proof of his veracity. But his friend was a practical joker and found a way to make them grow to immense size (a little bigger at each call). So they, probably, were the biggest ever.—Gilbert S. Walker, Pittsburgh.

Reader's Page

I read your magazine and I think it is wonderful! It should be in all schools to promote science and American ingenuity. Why not devote a page in your SCIENCE NEWS LETTER for the readers to write and discuss their amateurish ideas and inventions? Thanks.—J. S. Badon, Breaux Bridge, La. *Here's the page right here.*

Laws of Matter Up-to-Date

This compilation (SNL, June 19) is one of the cleanest condensations that I have ever read. I am filing it for future reference.—M. L. Ballou, Arlington, Va.

Televised Ocean Bottom?

It would be a good idea if the Woods Hole Oceanographic Institution would use television on its vessel "Atlantis" to see what is at the bottom of the sea (SNL, Aug. 14)—R. Youngblood, New York City.

Question Box

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NUCLEAR ENERGY PLANT—This is a preview around which industrial life is expected to center in the closing part of the Twentieth Century. In the foreground is a pile building with processing structure behind it and Power Unit at the rear. It was displayed by The Kellex Corporation at the Atomic Energy Exhibit in New York.

MEDICINE

Rh Factor Clue To Race

Basques are believed to be an almost pure representative race of ancient Europe. Discovery that they are predominantly Rh negative supports this theory.

➤ TWO MYSTERIES of science may have been partly solved by a blood study of Europe's most puzzling people, the Basques of northern Spain, evidence presented to the International Society of Hematology, meeting in Buffalo, indicated.

The mysteries are:

1. Where did the Basques, who have a strange language and culture, come from?

2. Will European races continue to have "incompatible" Rh positive and Rh negative blood?

Basques may be the purest descendants of a race that lived in Europe before the invasion of the Mongoloid hordes from Asia. Blood study of 400 Basques has revealed that they are nearly a pure Rh negative group, Drs. A. E. Mourant, Elizabeth W. Ikin and J. M. Chalmer of the Lister Institute, London, told the Society. Their study was based on work done by Prof. J. B. S. Haldane of England and Dr. A. S. Wiener, New York.

European racial groups have an estimated mixture of 60% Rh positive genes and 40% Rh negative. This division is believed to have occurred when Rh negative European peoples were invaded from Asia by an Rh positive race. Thus, the Rh negative Basques have probably inhabited Europe longer than the mixed or positive Rh peoples.

The Rh factor is involved in a disease producing hereditary anemia in the newborn. Incompatibility of the blood groups between an Rh negative mother and an Rh positive father produces an Rh positive baby. Just as antibodies form in the blood to kill disease germs, so the mother's antibodies injure the blood cells of the baby, often resulting in death.

This Rh complication is likely to continue in European races, the British scientists predicted. Neither the Rh positive nor the Rh negative genes have been wiped out in more than 10,000 years of mixing, their studies indicated.

Over a much longer period of time and by a very slow process, they theorized, it is possible that the rare Rh negative may some time disappear.

The Basques are a group of some 800,000 people living in the region of the western Pyrenees mountains, which form the boundary between Spain and France. Scientists have been unable to explain the origin of this distinctive and rather secluded group. It has been suggested that the mystery of the origin of the Basques might never be solved.

Now, it appears that modern discoveries about human blood may offer some clues concerning the Basques which the people and their unique culture have not been able to provide.

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ICHTHYOLOGY

40,000 Kinds of Fish Are Known to Exist

➤ ALMOST ANY "fish story" may be true, because there are more than 40,000 different kinds of fishes in the world.

Fishes, from the Philippine goby, which is less than a third of an inch long and weighs less than a hundredth of an ounce, to the whale shark, specimens of which weigh more than 20 tons, are described by Dr. Leonard P. Schultz, Smithsonian Institution curator of fishes, and Mrs. Edith M. Stern in the new book, THE WAYS OF FISHES.

There are more fishes than any other backboned animals in existence, and more varieties of fishes than all varieties of mammals, birds, reptiles, or amphibians.

"Not all," says Dr. Schultz, "are creatures that can exist only in water and move only by swimming. Some walk, some fly, some breath air, some water.

"There are fishes with eyes divided somewhat like the bifocal lenses of spectacles—the upper part for vision in air, the lower for vision in water. There are fishes that burrow like moles, hibernate like bears, fight like tigers.

"Some are placid, others nervous and easily irritated. Among them are the timid and fearless, the lazy and energetic, the mild and bloodthirsty."

There are many poisonous fishes but they are not aggressive and only use their poison in self defense. The stingray, a close relative of the sharks, is one of the most poisonous. Some of these weigh nearly half a ton and have poison barbs more than a foot long.

Most bloodthirsty fish is the piranha of the Amazon and Orinoco. They are quite capable of nipping a finger or toe off a swimmer with their teeth like the blades of pruning shears.

The largest sharks are entirely harmless, but the great white shark and the hammerhead are extremely dangerous when they are excited by blood. They have a blood-curdling habit of slowly cruising around their victim a few times before suddenly going at him.

Some fish hibernate in ice. Since a freshwater fish freezes at a temperature a little lower than the freezing point of fresh water, the fish can be in a block of ice and still not frozen.

Lungfishes can breathe in air as well as water. Dr. Schultz explains that they may be on their way to evolving into land animals.

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GENERAL SCIENCE

Industry Must Disperse

► THE DISPERSION OF INDUSTRY is necessary for and vital to national defense. This is a basic conclusion of the National Security Resources Board. A new urban redevelopment for industrial and population dispersion is also essential.

World War II developed weapons of swift and widespread destruction capable of attacks of unprecedented effectiveness against industrial centers, the NSRB report states. Our previous isolation and security against weapons of destruction are gone. In time, no spot in the Nation will be any less vulnerable than another. There is no military defense against the atomic bomb except space.

While there will continue to be defense against any carrier which a potential enemy might use to deliver such a bomb, this defense alone is not sufficient. The task ahead is to distribute vital facilities over greater land area to reduce attractiveness of targets and increase security of plants and workers.

The National Security Resources Board was created in 1947 to advise the President concerning the coordination of military, industrial and civilian mobilization. Industry's security is bound up in national security. An important phase of the duty of the board is "the strategic relocation of industry."

The report points out that underground installations, although probably providing maximum protection, are not thought practical for application on a large scale. This is also true for special construction of above-ground facilities, employing fire, blast, or radiation-resistant materials. Either of these may be essential and justified in connection with some highly strategic facilities. Dispersion, however, is considered the most practical solution to the problem of strategic location.

Extreme difficulties would have to be overcome in the distribution of industrial plants. Among various factors are sources of supply, fuel and transportation facilities, the distributive pattern of the industry and the location of markets, and the availability of labor. Then the communities set up must have adequate highways, streets, homes, public utilities, schools, hospitals, police and fire protection, water and sewer systems.

Cities of not over 50,000 population are suggested, with communities separated from others by country areas. Communities of this size are also proposed in Britain. It is thought that they would be too small for attack by atomic bomb because of tremendous cost of each bomb.

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ASTRONOMY

Hundred White Dwarfs

► DISCOVERY of nine new white dwarf stars, announced by Dr. Willem J. Luyten of the University of Minnesota and Dr. David MacLeish of the Cordoba Observatory in Argentina, have brought the total number of these stars now known to 100.

Probably the strangest, and most interesting objects in the universe, these stars are so dense that a cubic inch of them, if brought down to earth, might weigh anywhere from one to 1,000 tons.

The first of these stars ever discovered had its existence as a star predicted from little erratic shifts in the motion of Sirius, the brightest star in the sky, even before the faint star had itself been seen. It was discovered with the eyes of the law of gravitation before it was first seen with the telescope in 1862. At first it was thought to be just an ordinary dwarf star, 400 times less luminous than the sun.

But in 1915 Dr. Walter S. Adams at Mt. Wilson Observatory discovered that it was white, and therefore intensely hot on its surface, and so small that it was only a little larger than the earth and 35 times smaller than the sun in diameter. This makes it 40,000 times smaller than the sun in bulk (volume), yet within that small space there is packed just as much matter as there is in the sun itself. This makes the star so dense that one cubic inch would weigh about 2,500 times as much as gold, or nearly one ton. The mystery deepened for all we could see of the star was gas, and hydrogen gas at that, the lightest of all gases.

It was not until a few years later that the late Arthur S. Eddington in England found the solution. We are here dealing with matter-in-the-raw where, under the conditions of extremely high temperatures, perhaps billions of degrees, all the atoms are "stripped" of their protective covering of electrons. This makes the atom so much smaller that it becomes possible to "pack" them much closer, and from pure theory it was now possible to predict that there should exist stars in which one cubic inch might "weigh" over 10,000 tons.

The name "white dwarf" was coined for these stars. They are extremely small, down to perhaps the size of the moon. They are extremely feeble in light, averaging perhaps one ten-thousandth of the light of the sun. Thus they are genuine "dwarfs" in every respect. In addition, they are very hot on their surfaces, shining with a light much whiter than that of the sun, and often even blue in color.

The discovery and explanation of these stars caused a minor revolution in astronomical and physical thinking. It also forged another, and very important, link in the chain of events that led eventually to the atomic bomb.

During the first two decades after the discovery of the first white dwarf progress was slow since in the beginning astronomers did not even know where to look to find more of them. White dwarfs are so extremely faint that they are hard to find.

Of the first hundred, 61 of the white dwarf stars have been found through the work done on the motions of stars at the University of Minnesota, with the active participation of the Steward Observatory of the University of Arizona, under the direction of Dr. E. F. Carpenter and Dr. P. D. Jose, and of the Cordoba Observatory, at Cordoba, Argentina.

Observations made at Cordoba were of especial importance since this observatory is situated in the southern hemisphere. From it can be observed a number of stars which are invisible from the United States. When the problem of where to find opportunities for the observation of these stars arose, the international spirit of cooperation always present in science asserted itself, and Dr. Enrique Gaviola, director of the Cordoba Observatory, offered the use of the facilities of this observatory and took an active part in planning the observations. The same cooperative spirit prevailed under his successor, Dr. Ricardo Platzeck. Observations for the discovery of further white dwarfs are still being carried out continuously with the 60-inch reflector of the Cordoba Observatory.

Originally Martin Dartayet was in charge of the telescope, and made most of the observations. Two years ago he was succeeded by Dr. David MacLeish and the present discovery of nine new white dwarfs comes as the result of these observations.

Of the 61 white dwarfs announced at the University of Minnesota, 35 were found on plates taken at Tucson, Ariz., and 26 on plates taken at Cordoba. Among the stars discovered there is one which appears 25,000 times too faint to be seen with the naked eye. From observations with large telescopes it can be proved that the star is between the earth and the moon in size, and so dense that one cubic inch would weigh about 250 tons.

Perhaps the most important among the 100 white dwarfs now known are those which form part of a double star. Only when two stars are so close together that their mutual gravitation makes them revolve around each other can it be determined how much they weigh. Nineteen such double stars have now been discovered, including one where both the stars are white dwarfs—the only system of its kind now known.

Science News Letter, September 4, 1948

Ceylon is a *black-tea* country: it exported over 287,000,000 pounds in 1947.

MEDICINE

Find "Grandaddy" Virus

Believe that a new viral agent that may be a "stem" virus of sleeping sickness has been found. May mean earlier immunization than now possible.

➤ WHAT MAY BE the first "granddaddy" virus, a new encephalitis agent, has been reported by Dr. W. McD. Hammon, University of California epidemiologist.

The scientist says that the new viral agent, known now only as BFS-867, may prove to be a "stem" virus from which the other "sleeping sickness" viruses, such as western equine and St. Louis encephalitis viruses, are descended.

Many virus researchers have long believed, on the basis of the close kinship of many viruses and their ability to mutate, that such progenitor types do exist. However, none has ever been reported before.

Discovery and identification of such viruses would have great implications for the control of many diseases. Presumably vaccination with a "grandaddy" virus of influenza, if one existed, would immunize against "A" and "B" types as well as others which may not now be known.

This would enable scientists to carry out an immunization program much earlier than is now possible. Because "A" type vaccine, for example, does not protect against "B" type, considerable time is lost in identifying the agent responsible for an epidemic before control measures are effected.

Dr. Hammon said that identification of BFS-867 as a "stem" virus of encephalitis is not yet positive; indeed, positive evidence may never be obtained.

However, exhaustive analyses of the agent, obtained from wild bird mites collected in the Bakersfield area, show that it cannot be explained as a simple mixture of encephalitis viruses.

To the astonishment of Dr. Hammon and Dr. W. C. Reeves, leader of the University's field party in the Bakersfield area, BFS-867 in high concentrations showed characteristics of the following encephalitis viruses: western equine, St. Louis, eastern equine, Japanese B, West Nile, and the "California virus."

In low concentrations it exhibited characteristics only of western equine and St. Louis types.

Dr. Hammon said that postulation of the theory that the new agent is a "stem" virus would explain much confusing evidence gathered in his researches on encephalitis in recent years.

For example, he and his colleagues have encountered a number of cases of double infection, patients with both western equine and St. Louis viruses. The number of these double infections is too high to be considered as due to chance alone.

Further, double infections in chickens, one of the reservoirs of the disease, have been about twice as frequent as could be expected on the basis of chance alone.

"The existence of a stem virus containing antigens to both would offer an easy explanation for these confusing findings," Dr. Hammon stated.

The scientist said he expects new viruses of encephalitis will be found, and that further evidence of a common origin for all of this group will be found.

At the present time the scientist and his colleagues are attempting to propagate BFS-867 and other encephalitis viruses in one of their natural hosts, the wild bird mites. The difficulties of doing this may prevent positive identification of BFS 867. The scientists have recently found that the bird mites appear only with the hatching of a clutch of eggs, and so it is necessary to have mating birds in order to have mites to infect and work with.

"Sleeping sickness" appears seasonally in the hot coast valleys, in the Midwest, in the Orient, in Africa and in other parts of the world. It strikes the higher nerve centers, sometimes causes death, and, particularly in the young, sometimes results in permanent brain injury.

Dr. Hammon's research is sponsored by the National Foundation for Infantile Paralysis, the U. S. Army Virus and Rickettsial Disease Commission and California public health agencies.

Science News Letter, September 4, 1948

CHEMISTRY

Yellow Powder Developed That Gives Off Oxygen

➤ A YELLOW POWDER which makes it possible for a man to carry his own atmosphere along with him was developed by chemists working for the Naval Research Laboratory during the war. This yellow powder is a potassium oxide. It has the ability to give off life-sustaining oxygen.

This use of a potassium oxide was described by Dr. B. D. Van Evera of George Washington University as a guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

This potassium oxide promises to play an important part in fire fighting, high altitude flying, submarines and possibly even rockets to the moon. It can be used to supply oxygen in a mask, providing this necessary element to a man inside a burning building or outside the earth's own atmosphere. A small can of it will last for hours.

Science News Letter, September 4, 1948

BUFFALO PUT TO WORK—Probably for the first time these animals are being used in industry to reduce grass cutting bills. They are being experimented with around tanks and pipelines in Gulf Oil's refinery.

ETHNOLOGY

Different Language Spoken By Each Sex Among Caribs

➤ MEN AND WOMEN frequently accuse the other of speaking a different language, but in one of the Western Hemisphere's most ferocious tribes of Indians this was literally true.

The Carib Indians of the West Indies had different languages for the two sexes. Women had to know the "man language" which was used when they talked to the men.

Other customs and traits of the Caribs may have helped give the American Indian a bad name among Europeans for centuries, Dr. Irving Rouse of Yale University states in a study of the Caribs which has just been issued by the Smithsonian Institution.

The modern word, "cannibal," is believed to come from the names, Calinagos and Caribales, which the Caribs were called. They were super-man-eaters, who raided other tribes frequently. Captured men were roasted and eaten, while women were enslaved.

The Caribs were also heavy drinkers, making beer from sweet potatoes. They smoked cigars and used chewing tobacco as money.

There are still some 500 Caribs on the British island, Dominica, in the West Indies.

Science News Letter, September 4, 1948

METEOROLOGY

Weather Observers May Report Via Walky-Talky

➤ COOLEST NEWS in the midst of the heat wave now gripping the East and Midwest concerns the weatherman of the future.

Meteorologists traveling singly or in pairs will cover the Arctic wastes, reporting weather observations via walky-talky, a University of Michigan scientist predicted in the journal, SCIENCE (Aug. 27).

Submarines, aircraft or trucks may be used to keep the wandering weather reporters of the Arctic supplied with food, Dr. William H. Hobbs suggested.

With enough observers covering carefully planned routes, it would be possible to have a daily weather map of the Arctic, which would aid forecasting here as well as in the far north.

Science News Letter, September 4, 1948

ECOLOGY

Seeds Collected in 1903 Found to Germinate

➤ IT WAS 45 years ago that a University of Arizona professor collected some seeds from the desert bush or small tree, mesquite. The scientist carefully mounted his herbarium specimens, noting the date they were collected.

The seeds remained mounted in the collection until last December when scientists of the Southwestern Forest and Range Experiment Station in Tucson, Ariz., took them off the sheet. Two of the five seeds began to absorb water immediately when placed between wet cloths, and one of them germinated. Two others germinated after their coats were nicked with a file.

That these shrub seeds would grow after being mounted for more than four decades may have practical importance in the Southwest, declared S. Clark Martin of the experiment station, in his report to the journal, ECOLOGY (July).

Years after land is cleared, mesquite may suddenly appear, he pointed out, because of the longevity of the seeds.

Science News Letter, September 4, 1948

INVENTION

Germanium-Helium Alloys For Rectifiers Patented

➤ GERMANIUM-HELIUM ALLOYS, suitable for making high-grade rectifiers to convert alternating current into direct current, and methods of making the alloys, have been awarded a patent.

Randall M. Whaley, West Lafayette, Ind., assigned the patent, No. 2,447,829, to the Purdue University Research Foundation. The new developments were made at Purdue in conjunction with work carried out under the direction of Dr. Karl Lark-Horowitz. Use of the metal, germanium, in rectifiers is one of several important applications developed under the direction of Dr. Lark-Horowitz.

The germanium-helium alloys just patented are not alloys as the term is generally used. In this invention germanium metal is impregnated with helium gas. The combination exhibits electrical properties such as are found in metals and in what is known as semi-conductors. These are materials which have high electrical resistance to current passing in one direction, but low resistance in the other.

Impregnation of the germanium with helium may be accomplished by melting pure germanium at a temperature above its melting point of 960 degrees Centigrade to about 1,050 degrees in a boat or crucible in a suitable furnace. The molten metal is then maintained in an atmosphere of helium in the furnace for from five to 15 minutes.

After the germanium and helium are mixed, the melt is allowed to cool. It is cut into wafers, ground and etched. It is ready then to be embodied as the semi-conductor in a contact-type rectifier. Electrical semiconductors containing germanium have been produced which promise to have varied applications in the fields of radio, radar and microwaves. They may also have application in converting light into electrical effects.

Science News Letter, September 4, 1948

IN SCIEN

GENERAL SCIENCE

Adequate Street Lighting Cuts Night Traffic Deaths

➤ THE DEFINITE relation between deaths from night traffic and adequate street lighting is shown by studies recently made by the Street and Traffic Safety Lighting Bureau, of Cleveland, in 12 cities with improved lighting systems. They show that night traffic deaths in these cities decreased 75%, due largely to the better lighting.

The study included widely distributed cities in the United States, stretching from New England to the west coast. The reduction in night deaths, the bureau states, followed the installation of sufficient light to permit motorists to see dangers after dark in time to avoid them.

During 1947, there were 18,400 dark-hour fatalities in the United States and approximately 500,000 injuries. Two thirds of all traffic deaths result from night accidents. The value of property destroyed in these automobile crashes was over $500,000,000, the bureau asserts. A nation-wide 75% reduction with modern adequate street lighting would save 13,800 lives a year. In addition, well lighted city streets are well known to be a protection against crimes of all sorts.

Science News Letter, September 4, 1948

WILDLIFE

Animals Enjoy Gardens Treated with Weed-Killer

➤ ANIMALS just can't resist gardens treated with weed-killer, it appears.

Workers at the Pennsylvania Agricultural Experiment Station at State College, Pa., who are conducting experiments with chemical weed-killers have found this out to their sorrow.

After applying the chemicals, scientists have found that dairy cattle and other livestock, even deer and wildlife of many sorts would flock to the treated areas and eat up the sprayed weeds before they had a chance to study the effectiveness of the chemicals.

The weed-killer has apparently done the raiding animals no harm.

Cows will leave succulent pastures to eat fence row weeds which have been sprayed with plant-destroying chemicals. Rodents seemed to be especially attracted to plots where the weed killing compound, 2,4-D, was under test. These small animals apparently traveled a considerable distance to reach the treated fields.

"Several of the plots were attacked so severely," explains a report from the station, "that yield records could not be compiled."

Science News Letter, September 4, 1948

CE FIELDS

ENGINEERING

Group Air-Conditioning Of Buildings Under Trial

➤ AIR-CONDITIONING from a central plant is being provided for all stores, offices and a motion picture theater in a 16-acre shopping center at a Long Island site within New York City. It is the first installation of its kind.

Heating a group of buildings from a central heating plant is nothing new and the scheme is in successful operation in many American cities. But central air-conditioning is new; this is said to be the first project of this type ever undertaken.

The shopping center where the installation is made is at Fresh Meadows, Long Island, where a 170-acre tract of land is being developed for a residential community of 10,000 persons by the New York Life Insurance Company. To provide the air-conditioning service, two electric-driven centrifugal compressors built by Carrier Corporation, Syracuse, N. Y., are employed.

To furnish air conditioning for the shopping center, chilled water, piped through more than a mile of 12-inch pipe under a 100-pound head pressure, will be delivered to the individual stores. The compressors in the central plant will be supplied with condenser water from two specially bored wells. The used water from the condensers will be returned through two diffusion wells to the same underground strata from which pumped.

Science News Letter, September 4, 1948

PHYSICS

New Watt-Hour Meter Is Suspended by Magnetism

➤ AN ELECTRICAL METER of the watt-hour type, with its rotating disk floating in the air supported by magnetism, was revealed in Spokane, Wash., to the American Institute of Electrical Engineers by H. E. Trekell, L. I. Mendelsohn and J. H. Wright, all of the General Electric Company, Lynn, Mass.

A watt-hour meter is an instrument that records the electric power delivered to a user in terms of watt-hours. The present watt-hour meter has mechanical bearings. These wear out from friction, and have to be checked at intervals. In types with hardened pivots running in bearings of sapphire, checking may be only once in eight years. With this magnetic suspension of the watt-hour rotor little checking will ever be required, and inspection costs to a utility company will be decreased.

By supporting the weight of a watt-hour meter disk magnetically, a bearing system free from high unit pressures and, hence, free from the fundamental cause of wear, is achieved, they said. The magnetic arrangement employs two concentric magnets of cunico, the inner attached to top of the shaft, the outer attached to the meter frame. Cunico is a magnetic alloy of an advanced type now widely used in permanent magnets.

Magnetic suspension has been found suitable for use in several laboratory precision instruments during the past few years. It permits rotation without mechanical friction. Repulsion-type magnetic suspension is ordinarily employed. With the use of newer magnetic alloys of the alnico and cunico type, it is possible to support a movable magnet by repulsion without excessive demagnetization which occurs with earlier magnets.

Science News Letter, September 4, 1948

BIOCHEMISTRY

New Vitamin Promising For Pernicious Anemia

➤ AN UNIDENTIFIED VITAMIN that gives promise of being effective against pernicious anemia has been produced by bacterial fermentation at Lederle Laboratories Division, American Cyanamid Company.

Known simply as "animal protein factor," the substance is related to the Vitamin B family and is also found in purified liver extract. It is produced by the fermentation of certain immobile, rod-shaped bacteria.

Animal protein factor is now undergoing trials on human beings. In two cases of patients stricken with pernicious anemia, both responded as if they had been treated with liver extract.

The new vitamin component was first discovered in hen houses. Scientists observed that in warm weather hatchability of new chicks improved. This was traced to a bacterial fermentation which took place in the hen house litter. Further research indicated that the unidentified vitamin was present in liver extract, used medicinally in treating pernicious anemia.

"The next step was to control the fermentation of these vitamin-producing bacteria in order to obtain an extract which would be effective in pernicious anemia," a spokesman for Lederle Laboratories stated.

Research workers at Lederle Laboratories and Western Reserve University, Cleveland, tackled the problem. They isolated many different bacteria in pure culture, grew each in a special medium and tested the product upon chickens. Using the chickens as a "yardstick," they developed a special preparation suitable for treating pernicious anemia in humans.

If clinical tests now in progress prove successful, the source of the anti-pernicious anemia factor will be greatly expanded. At present these factors are obtained by a lengthy process of extraction from liver.

Science News Letter, September 4, 1948

GENERAL SCIENCE

Your Lawnmower May Cut Grass too Short Now

➤ MOST LAWN MOWERS are unfit for use on fine grass this time of year, warns Prof. M. T. Munn, head of the seed testing laboratory at the New York Experiment Station, Geneva, N. Y.

Lawns should not be cut lower than two inches in July and August, explains Prof. Munn. But most mowers will not cut as high as two inches on the level without enlarged wheels or rollers, he charges.

When you cut your grass too short, you may find your blue grass lawn taken over by other grasses and weeds such as plantain, Prof. Munn says. Fine grasses, and blue grasses particularly, are weakened and actually driven out by being cut too low.

Too low is less than an inch and a half in the spring, but at this time of year, two inches is the minimum height, the scientist cautions.

Prof. Munn adds that heavy rolling in the spring, as well as close cutting in the summer, helps drive out fine grasses on lawns.

Science News Letter, September 4, 1948

ELECTRONICS

Krypton Gas Gives Better Fluorescent Lighting

➤ FLUORESCENT LAMPS, using krypton gas instead of argon, were revealed by Westinghouse. They give higher efficiency and, therefore, will decrease electric light bills.

Krypton, one of nature's rarest elements, is used in a new Westinghouse 85-watt fluorescent lamp. It provides a 17% gain in efficiency over the generally used argon gas, Dr. A. M. Hageman of the Westinghouse Lamp Division stated. The 85-watt lamp provides as much light as the 100-watt argon-filled lamp it replaces, and matches its predecessor equally in good maintenance and other features.

Krypton is one of the rare gases found in very small quantities in the atmosphere. The others are helium, neon, argon, and xenon. They are all inert and exist in "trace" quantities. They can be separated by the distillation of liquid air. The substitution of argon for the formerly used nitrogen in electric lamps has saved many millions of dollars. Krypton promises even a greater saving.

Other applications of krypton in lighting have already been made. A quartz tube lamp Westinghouse developed for the airport approach lighting system of the New York International Airport (Idlewild) is filled with this gas. The lightning-like flashes from them are designed to pierce even zero-zero weather for at least 1,000 feet, to guide pilots to the runway. Krypton is also used in a Westinghouse miner's incandescent lamp.

Science News Letter, September 4, 1948

ARCHAEOLOGY

Guardian of Antiquity

Expedition discovers a doorkeeper that has kept his post for more than eight centuries at St. Catherine's Monastery at the foot of Mount Sinai.

By Dr. FRANK THONE

See Front Cover

➤ THE OLD DOORKEEPER was about to leave his job. He was reluctant to give it up, for it was the only one he had ever had, and he had held it for 60 years.

The people he had served faithfully and well through all that time were reluctant, also, to see him go. But there was nothing they could do about it; he could not be held against the call which had now come for him.

For Brother Stephen was dying.

"Father Abbot," he said, as he looked up from his pallet at the bearded face of his superior, "I only wish I might be allowed to keep watch by the door here forever!"

"My son," replied the abbot, "you shall have your wish."

So Brother Stephen died with a smile on his face. And his fellow monks, instead of burying him, robed him in a new habit, with the symbols of his faith embroidered on the scapular, and set him down on a chair beside the door of the crypt that holds the bones of all the departed members of the community, as shown on the cover of this week's SCIENCE NEWS LETTER. There he is sitting still, after more than eight centuries—easily the longest record for holding one job on this insecure planet.

Brother Stephen

This is the story of Brother Stephen, monk of the Greek Orthodox Church at the Monastery of St. Catherine, which stands at the foot of Mount Sinai, the rugged peak where Moses received the Tables of the Law. It was in the sixth century that he took up his long vigil. In the middle of the twentieth, by arrangement with the present head of the monastery, he posed for a portrait before the camera of William Terry, field executive of the University of California African Expedition.

Mr. Terry and his party visited St. Catherine's not on a pious pilgrimage but as a part of their scientific undertaking to amass all possible scientific data about the peoples of Africa, from one end of the great continent to the other.

Strictly speaking, of course, the Sinai peninsula is a part of Asia. However, it sits at the threshold of Africa just as Brother Stephen used to sit before the door of his monastery. Moreover, it is politically a part of the Kingdom of Egypt, and ecclesiastically St. Catherine's Monastery is subject to the Patriarch of Alexandria. So it could quite legitimately be included in the scope of the African Expedition.

For a physical anthropologist, the monastery appears to be a veritable treasure-house. It has thousands of the kind of specimens that interest him most—human skulls. The skulls are those of former members of the community. And they have been accumulating for nearly 1,600 years, for the monastery claims A. D. 363 as the year of its founding.

When a monk of St. Catherine's dies, he is buried in one of the seven permanent graves in the monastery chapel. He remains there until his flesh has partly disappeared, partly mummified in the dry atmosphere of the desert.

Rotate Seven Graves

The seven graves are used in rotation. As each monk becomes a candidate for occupancy of one of them, the grave that has been occupied longest is opened and the now well-dessicated remains of its tenant are removed.

They are taken to the general storage-vault for bones, watched over by Brother Stephen. The limb bones and the trunk skeleton are added to a great stack at one end, while the skull is added to the mound of skulls at the other. Although the community at St. Catherine's is not large—only 20 monks—it has been there so long that there are plenty of skulls for even the most eager of anthropologists to measure.

Living thus in the constant presence of all their predecessors does not make the monks gloomy or severe. Their business is the contemplation of eternity, and with that point of view they can look upon death quite calmly as a mere incident. To anthropologists also death is not too unpleasant: it is as natural and inevitable at one end of life as birth is at the other. So the scientists and the monks had a common ground on which to meet.

The monks introduced them to another pair of notable early members of their community. These were two exceedingly zealous young monks—now skeletons for many centuries—who took vows to spend their whole lifetime in unceasing prayer, day and night.

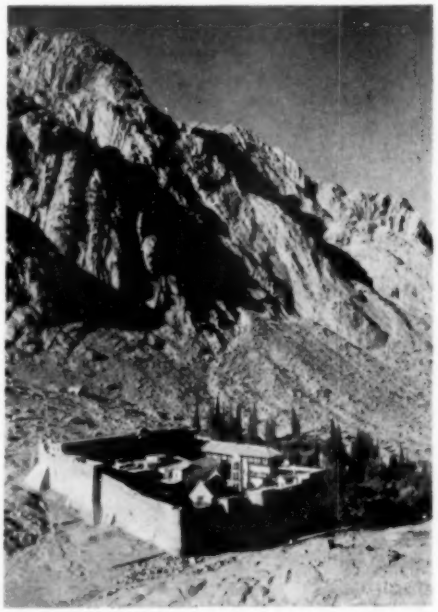
They had only entered the monastery, at 18 years of age, when they undertook this heroic feat of asceticism and devotion. Although they lived side by side they never saw each other again. Each stayed in his cell, and the two were linked together by a chain that ran through an opening in the wall. If either failed to hear the voice of his brother in prayer, indicating that he had fallen asleep, he could tug on the chain and thus arouse him again.

It is probable, of course, that both fell asleep simultaneously at times, else they wouldn't have lived very long. However that may be, they died together as they had lived together, and their bones now rest side by side in a pair of open caskets—still united by the chain.

Patroness of Monastery

Although the monastery of course can offer no hospitality to women, it has one permanent feminine resident, at least in part: the skull and a portion of the hand of St. Catherine of Alexandria, patroness of the institution. Catherine, first of a half-dozen or so female saints of the same name, was a young daughter of the Roman nobility. Converted to Christianity, she was so outspoken an advocate of her faith that she was first tortured and finally beheaded. So now her skull is kept in the monastery at the foot of Mount Sinai as a holy relic.

The monastery itself, though a place of peace, is stoutly walled against a hostile world, for it stands in a region that has been Moslem since the days of Mohammed himself. It has been assailed many times,



ST. CATHERINE'S MONASTERY —The walled monastery, dating back to the fourth century, nestles against the base of craggy Mount Sinai, an oasis of peace in a savage desert.

***PILE OF HUMAN BONES**—Two of today's monks at the monastery add to the great pile of bones left by departed members of the community; the skulls go to another stack.*

but the nomads could not get over the wall, and they were not equipped with siege engines to breach it. That the wall is really old is attested by marks made on it by visiting western knights during the Crusades.

St. Catherine's Monastery is known to the learned world chiefly as a repository of a great mass of ancient manuscripts, including some of the oldest known texts of the Bible. Most of these of course are in Greek, but there are hundreds in Syrian, Arabic, Coptic and other languages. Even yet there are thousands of pages that no modern scholar's eye has ever seen.

Science News Letter, September 4, 1948

RADIO-PHYSICS

"Cosmic Noise" Studied

➤ "COSMIC NOISE" which left a region in outer space about 3,000 years ago is interfering with television, radar and FM and short-wave radio communication today. These mysterious energy waves have been recorded and studied by Australian scientists.

This radio frequency radiation comes from a mysterious space in the group of stars which forms the constellation Cygnus, the swan. It is a region where there are very few stars and little visible light.

J. G. Bolton and G. J. Stanley of the Division of Radiophysics of the Council for Scientific and Industrial Research have reported their investigation in the first issue of the new AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH (March) published in Melbourne.

The radiation source in Cygnus, they explained, produces the second loudest "cosmic noise" of any place in our galaxy, the Milky Way. A place in the constellation Sagittarius, the archer, in the center of our Milky Way produces the loudest "cosmic noise" while "solar noise" from the sun produces even greater effects on communications since the sun is so much nearer.

The point in Cygnus which "broadcasts" to earth is unusual because it sends out two kinds of signals. One signal is of constant intensity at about 100 megacycles frequency and above; the other is of varying intensity and uses frequencies below 100 megacycles.

The Australian scientists found that this spot in Cygnus sends 1,500 times more energy to the earth than any point in the surrounding area. The source is probably some 3,000 light years from the earth.

Maps of the sky showing the different frequencies of radiation coming from various spots in the heavens have been made by Grote Reber of the U. S. National Bureau of Standards.

The source of the energy waves is not associated with any stars or nebulae. The

"There are no problem children, only problem environments and parents."

EMOTIONAL MATURITY

by LEON SAUL, M.D.

An authoritative book that presents a wider understanding of the minor mental neuroses from which no one is entirely free. This is not a study of the extremes of insanity, but of the neurotic tensions and vulnerabilities within a person that through the pressure of unfavorable circumstances can drive him to the breaking point.

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Do You Know?

In what is called cold cathode *fluorescent lighting*, the lamp has a similar appearance to other fluorescent lighting but the cathode operates relatively cool and no preheating is required; when the switch is pressed it lights immediately.

The wily *crow* will abandon a tree formerly used as a roost if he detects any changes made in the vicinity of the roost; he is quick to detect such things as a dynamite bomb installed to destroy him and his flock.

The so-called *"Boston Stone,"* recently rededicated in Massachusetts, is a stone two-barrel trough brought from England late in the 17th century and used for grinding oil and pigments for paint by means of large stone ball.

Wheat was practically the only raw material available in large quantities during the war for the production of alcohol, an essential for making munitions and synthetic rubber; corn and molasses, normal sources of industrial alcohol, were scarce.

Measure Current Precisely With K-2 Potentiometer

Scientists at Institute for Atomic Research, Iowa State College, Ames, Iowa, chose this K-2 potentiometer for its precision and facility of use. They determine current in the magnetic coil of a Beta-Ray Spectrometer by measuring voltage across a standard 0.01 ohm shunt.

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energy probably comes from ionized particles in outer space.

Scientists now believe that the energy comes from protons, positively charged particles which are part of the core of atoms, and negatively charged particles, electrons, in outer space. Radio frequency energy is sent out to earth when an electron, which has been attracted by a proton until it circles around and around the tiny particle as a comet circles around the sun, finally manages to pull away. When this happens, energy of radio wave frequency is released. This process is called free-free electron transition.

Science News Letter, September 4, 1948

ASTRONOMY

Stars Eject Cosmic Rays

➤ COSMIC RAYS, created in the atmospheres of certain stars whose magnetic field fluctuates violently, are shot forth periodically from these stars.

This latest theory of the birth of cosmic rays is advanced by Dr. Horace W. Babcock of Mount Wilson Observatory of the Carnegie Institution of Washington.

The random directions from which cosmic rays approach the earth would thus be explained, Dr. Babcock points out. Full details concerning his new theory appear in the PHYSICAL REVIEW (August 15).

The number and distribution of magnetically active stars is not yet definitely known, but they are probably fairly numerous throughout the disk-shaped galaxy.

It was Dr. Babcock's continued study of the peculiar star HD 125248 that led him to picture such stars as ejecting cosmic rays. In this star, the polar magnetic field regularly changes from plus 7,800 gauss to minus 6,500 gauss, and back, in 9.295 days.

The star's alternating magnetic field suggests that at certain phases the suppressing effect of space charge that tends to keep cosmic rays close to the star will be eliminated. Periodically positive ions and electrons, Dr. Babcock reasons, are ejected alternately from the polar regions of the star at certain phases of each magnetic cycle.

Lines in the star's spectrum change in intensity as indicators of the changing magnetic cycle. The width of the europium lines, for instance, is greatest when the star's magnetic field reaches maximum; the chromium lines are widest when the greatest negative magnetic intensity is attained.

About a score of these peculiar variable stars, brighter than the sixth magnitude and thus visible to the naked eye, are known. All are suspected to have varying magnetic fields. But these magnetic variations are more fundamental than the mere changes in line intensity would indicate, the Mount Wilson astronomer says.

Science News Letter, September 4, 1948

ASTRONOMY

Satellite Missile Needed

➤ DEVELOPMENT of a satellite missile which, like a moon, will continuously circle around the earth—600 miles or so above the surface—is being seriously considered by American scientists.

This was revealed to the Association of Terrestrial Magnitude, affiliate of the International Union of Geodesy and Geophysics, Oslo, Norway, in a communication from Dr. James A. Van Allen of the Applied Physics Laboratory of Johns Hopkins University.

Such a missile would carry scientific instruments needed to collect data about the rarefied atmosphere surrounding the earth. Once started, no fuel would be needed to keep the missile circling around our planet.

In the even dimmer future is the prospect of astronomical flights into space, Dr. Van Allen's statement said.

Today rockets enable scientists to explore the upper atmosphere by carrying apparatus high above the earth. Many missing links in the physics of the upper air will be filled in through the help of these instruments.

Since this rocket research began two years ago, scientists have:

1. Measured the cosmic ray intensity above the atmosphere.
2. Captured samples of air 35 miles above the earth's surface.
3. Produced smoke puffs and smoke trails at high altitudes to study wind velocities.
4. Measured the atmospheric temperature and pressure up to 40 miles.
5. Extended the solar spectrum far into the ultraviolet.

Up to July 1, some 31 V-2's had been fired with upper atmosphere equipment as the primary payload. Twenty-one of these flights have been successful, attaining summit altitudes ranging from 62 to 114 miles, with an average of 84 miles.

Data obtained through rockets have been captured by two principal methods:

1. By radio from a suitable multi-channel transmitter in the rocket to a system of receiving and recording stations on the ground. This is called telemetering.
2. By actually recovering the records produced within the rocket during flight.

It was soon realized, Dr. Van Allen continued, that captured German V-2's, converted from war to peacetime use, would provide at best a series of high altitude

flights of limited extent. Furthermore, the V-2's are extremely complicated and expensive. Consequently a small, relatively inexpensive rocket called the Aerobee was developed for use in carrying equipment into the upper air.

Leading research agencies primarily responsible for the rocket experiments are: the Naval Research Laboratory; the General Electric Company, under the sponsorship of the Army Ordnance Department; the Air Material Command of the Air Force; the Army Signal Corps Laboratories; Princeton University; and the Applied Physics Laboratory of Johns Hopkins University, under the sponsorship of the Navy Bureau of Ordnance.

Dr. Van Allen pointed out that all high altitude experiments to date have been made over the White Sands, N. Mex., Proving Ground. Before we begin to really learn about the upper air, he said, repeated flights with identical instruments must be made at different geographical locations, at different seasons, at different times of year.

Science News Letter, September 4, 1948

MEDICINE

New Artificial Kidneys

Two methods for removing wastes from the blood when the kidney has stopped functioning, are presented. These devices simulate natural processes.

➤ ARTIFICIAL man-made kidneys can now be hooked onto the human body's blood vessels in an emergency to cleanse the vital fluid of wastes that would cause death.

Two artificial kidneys are being announced to the scientific world. One of these is a completely new type that is simply a sheet of cellophane sandwiched between two rubber pads.

This imitates the action of the natural kidney by allowing blood to pass through its "vessels" which in this case are grooves. On the other side of the cellophane another set of grooves in the rubber carry chemical solutions in the opposite direction. These snatch the impurities from the blood and return it, cleansed, to the body.

This new apparatus is reported to the journal, SCIENCE (Aug. 27) by Jack R. Leonards of Western Reserve University in Cleveland and Leonard T. Skeggs, Jr., formerly of Cleveland, now with the Crile Veterans Administration Hospital in Parma, Ohio.

Chemical solutions do the work which the kidney neglects because of disease or absence. They separate the sugar, salt and water in the blood, concentrate the waste products which are urine, and remove them.

They explained that this apparatus shows promise both as a laboratory tool and as an artificial kidney. It has the advantage, they declared, of being efficient, easily sterilized since the entire apparatus can be immersed in a laboratory pressure cooker, and of having a large surface through which solutions can be passed.

Another artificial kidney which filters the waste products in the blood through a cellulose membrane has been developed by three Canadian researchers. Dr. Gordon Murray, Dr. Edmund DeLorme, and Newell Thomas, of Toronto, report their developments in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 28).

A pump is used by this machine to remove by means of a tube the blood from the large trunk vein of the body, pass it through the membrane and into the opposite vein of the flank.

The membrane is subjected to a chemical bath while the blood passes through it so that the poisonous body substances can be removed. In addition, heparin, an anti-blood-clotting substance, is added.

The Canadian scientists report that the apparatus has been successfully used on patients and several days of treatment causes no ill effects.

Science News Letter, September 4, 1948

VETERINARY MEDICINE

Brucellosis Found To Be Transmitted Through Air

➤ BRUCELLOSIS, also called undulant fever and Malta fever, can be transmitted through the air, it is revealed in the JOURNAL OF INFECTIOUS DISEASES (Aug. 30).

A British scientist, Dr. David W. Henderson, and Dr. Sanford S. Elberg, of the University of California, reported that monkeys, mice and guinea pigs were infected by exposing them to an artificial cloud containing brucellosis organisms.

Infection by the drinking of infected milk or through the skin from the handling of diseased livestock are the only routes that previously had been scientifically demonstrated, though the air route was suspected.

The scientists said that man can probably be infected by the air route as well as animals, though this remains to be proved by definite evidence. Drs. Henderson and Elberg reported they were able to determine the concentration of Brucella organisms in the air needed to cause infection; and that it is probable that such a concentration would be present in stockyards during the slaughtering season.

Dr. Elberg revealed that there was a rather high incidence of the disease among certain laboratory personnel during the experimentation, carried on during the war at the Army's Camp Detrick, Md., bacteriological warfare laboratories.

Airborne transmission was indicated in many of these cases. Frequently there were no accidents which could explain transmission of the disease on the basis of handling or drinking of infected material. Air and dust tests in the laboratory showed the organisms existed in these media, and strengthened the possibility of airborne transmission.

Brucellosis is a generalized infection marked by intermittent undulatory fever, malaise, cervical pain, headache, sweating, weakness and anemia. There are three types of the infection: porcine (swine); bovine (cow) and caprine (goat). The last was the first type reported, being discovered on the island of Malta.

The occurrence of swine type brucellosis is high among stockyard workers, and the three varieties are frequently found in the general population. While 27,299 cases were reported in the U. S. for 1940-46, scientists estimate the actual number of cases is much larger.

Science News Letter, September 4, 1948

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PSYCHOLOGY

GI's Queries on Sex

➤ HERE ARE SOME of the questions asked by GI's in Germany about sex:

What are the best methods of birth control?

Can exposure to radar or high-altitude flying make men sterile?

Will wives separated from their husbands for long periods suffer psychological ill effects from abstinence?

These are only a few of the 1,127 questions asked by GI audiences of lecture teams who traveled throughout the German occupation zone.

Dr. Alfred C. Kinsey of the University of Indiana, called his now-famous report, "Sexual Behavior in the Human Male." Dr. Fred Brown of Mount Sinai Hospital calls his report on GI sex questions, "What American Men Want to Know About Sex." It is published in THE JOURNAL OF SOCIAL PSYCHOLOGY.

Birth control questions were the most-asked, with persistent interest shown in the so-called "rhythm method" of contraception.

Curiosity about sex expression and questions on sterility were tied for second place in frequency among the queries put to the lecturers.

More than 20,000 U. S. troops in Germany during the first six months of 1946 attended the panel on sex—called "Sex: Fallacies, Facts and Problems"—which Dr. Brown originated. GI's were encouraged to ask questions. The list which Dr. Brown reports on was compiled from the queries by the soldiers.

The GI's in Germany were concerned over possible effects of abstinence, both on themselves and on their wives.

Some of their questions betrayed interest in some of the more popular fallacies about sex. They wanted to know about the effect of foods such as oysters or eggs on potency. Others asked about tobacco or alcohol. A published report that a German prisoner had undergone a sex transformation brought frequent questions about sex abnormalities.

Dr. Brown found that the program indicated great ignorance of sex. There is a need, he declared, "for reliable sex information in America."

"Sex Hygiene" lectures given in colleges and universities are "too guarded and overloaded with moral admonitions and precautions to meet the needs of adults," Dr. Brown charged. Lectures on sex, he commented, too often discuss what the lecturer believes is important, not what his audience wants to know.

A program such as the sex panel for GI's in Germany should be given in high schools and colleges, he suggested.

Not included in the list of frequently asked questions, Dr. Brown pointed out, was one which was heard often from the floor during the panel discussions:

Why are questions of sex so avoided by the American people?

Science News Letter, September 4, 1948

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RADIO

Radio Transmission Coded

➤ AFTER MARCONI demonstrated radio 50 years ago, its first application for transmitting intelligence used a telegraphic code consisting of a series of short pulses. Later, radio was developed for speech transmission, but recent developments again use a code of short pulses, this time for the transmission of speech. A complete cycle has been made back to something like the telegraphic code used by Marconi.

This new development was described to the American Institute of Electrical Engineers by H. I. Romnes of the American Telephone and Telegraph Company, New York. The system is known as pulse code modulation. In this samples of a speech wave, taken at intervals, are transmitted instead of the continuous wave.

In the system explained by Mr. Romnes, samples of the speech wave are taken 8,000 times a second and each sample is translated into a seven-unit code which carries over the radio circuit information as to the magnitude of the sample, thus permitting the speech wave to be reconstructed at the receiving end.

Systems have been built in the laboratory in which information as to samples from 100 different speech channels may be transmitted over the same radio channel on a time-sharing basis, he stated.

The advantage is that there can be great disturbances, variations and distortions in the transmission medium without affecting the quality of the speech, since it is only necessary to determine at the receiver whether the signal is present or absent, with no gradations in between, in order to perfectly reconstruct the original speech signal. In this system millions of signal pulses are sent each second, while in the system used by Marconi only tens of pulses per second were sent.

Science News Letter, September 4, 1948

Electric Energy Dear

➤ COMPARATIVE costs of transmitting energy in the form of coal, gas, oil and electricity were presented at the same meeting by R. E. Pierce and E. E. George, both of Ebasco Services, Inc., New York City. It has been rather usual practice to locate power plants near fuel and water and transmit the energy electrically to the load. If the transmission of electrical energy produced from fuel involved distances in the order of 200 miles, the economics of the practice is questionable, they said.

Electric transmission at high load factors is competitive with hauling coal for any distance up to several hundred miles. Electric transmission is generally much more expensive than transporting energy by gas or oil pipe lines. If gas or oil is to be used for fuel, a power plant location near where the electricity is to be used will always be the most economical, they declared.

From hydroelectric plants energy is transmitted as electricity. The so-called "cheap power" from such sources is not cheap if the energy has to be transmitted to a distant market. With the investment cost of a hydro plant generally greater than for a similar size steam plant, hydro power would be more costly than steam power by the time it was delivered a few hundred miles away. In areas of low fuel cost, hydro power transmitted even shorter distances would be more expensive than steam power.

Science News Letter, September 4, 1948

METEOROLOGY

Artificial Rain Making Attempted in India

➤ ARTIFICIAL RAIN MAKING is being attempted in western India because of delay in the arrival of the rains of the monsoon. Ice pellets will be dropped from airplanes in an attempt to bring moisture to the suffering millet and rice crops.

The Indian Embassy in Washington is inviting cooperation from American scientific institutions in the experiments which are in the newly-grouped states called Saurashtra.

Science News Letter, September 4, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publications direct from issuing organizations.

THE COMMUNICATION OF IDEAS: A Series of Addresses—Lyman Bryson—*Harper*, 296 p., $3.50. Based principally on lectures in a course of the Institute for Religious and Social Studies. Very helpful to those who wish to express themselves clearly.

DICTATORS AND DISCIPLES FROM CAESAR TO STALIN: A Psychoanalytic Interpretation of History — Gustav Bychowski — *International Universities Press*, 264 p., $4.25. This analysis of the conditions that produce dictators and their willing followers is intended to serve toward their prevention and a more rational shaping of history.

ELEMENTARY TEACHERS GUIDE TO FREE CURRICULUM MATERIALS—John Guy Fowlkes and Donald A. Morgan, Eds.—*Educators Progress Service*, 5th ed., 208 p., paper, $4.50. Listed by subject with a title index and alphabetical list of sources.

ELIMINATION OF WATER FROM WET CRUDE OIL OBTAINED FROM BITUMINOUS SAND BY THE HOT WATER WASHING PROCESS—K. A. Clark and D. S. Pasternack—*Research Council of Alberta*, 10 p., illus., paper, free upon request direct to publishers.

INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE—W. H. Camp, H. W. Rickett and C. A. Westherby—*Chronica Botanica*, 120 p., $3.50. This is the second printing of a previously limited edition for members of the American Society of Plant Taxonomists. The rules were adopted and revised by the International Botanical Congress of Amsterdam, 1935.

MAN IN THE MODERN WORLD: An Eminent Scientist Looks at Life Today—Julian Huxley—*New American Library*, 191 p., paper, 35 cents. Philosophical essays from two books originally published by Harper, Man Stands Alone and On Living in a Revolution.

THE METRIC SYSTEM OF WEIGHTS AND MEASURES: The National Council of Teachers of Mathematics — Twentieth Yearbook — Committee on the Metric System—*Bureau of Publications, Teachers College*, 303 p., illus., $2.00. A survey of the history, nature and advantages of this system.

RADAR SCANNERS AND RADOMES—W. M. Cady, M. B. Karelitz and Louis A. Turner, Eds.—*McGraw-Hill*, 491 p., illus., $7.00. A radar scanner is the assembly consisting of the antenna and the mechanism that causes the radiated beam to scan. Of interest particularly to mechanical and electrical engineers.

SALT, THE FIFTH ELEMENT: The Story of a Basic American Industry—Garnett Laidlaw Eskew—*J. G. Ferguson*, 289 p., illus., $3.00. The romantically written history of the sale and use of a common but important article of daily life.

SOME RECENT CONCEPTIONS OF COAL STRUCTURE — A. McCulloch — *Research Council of Alberta*, 6 p., illus., paper, free upon request direct to publisher.

SUCCESSFUL MARRIAGE: An Authoritative Guide to Problems Related to Marriage from the Beginning of Sexual Attraction to Matrimony and the Successful Rearing of a Family—Morris Fishbein and Ernest W. Burgess, Eds.—*Doubleday*, 547 p., illus., $6.00. A reference book for marriage counselors, newlyweds, and parents.

SURVIVAL OR SUICIDE: A Summons to Old and Young to Build a United, Peaceful World—Harry H. Moore, Ed.—*Harper*, 209 p., illus., $2.00. A number of authors contribute the chapters that describe the crises brought about by the discovery of atomic energy. Food for serious thought as international friction grows.

THIRTY-FIRST ANNUAL REPORT OF THE NATIONAL RESEARCH COUNCIL OF CANADA, 1947-48—*National Research Council of Canada*, 26 p., paper, free upon request to publisher. Appears in both French and English.

WARTIME COLLEGE TRAINING PROGRAMS OF THE ARMED SERVICES — Henry C. Herge and others — *American Council on Education*, 214 p., illus., $3.00. A review of what institutions of higher education contributed and what they gained from World War II experience.

Science News Letter, September 4, 1948

ANTHROPOLOGY

Gather Most Complete Skull and Bone Collection

➤ WORLD'S MOST COMPLETE collection of the skulls and bones which trace the development of man from his most primitive stages is now being built up at the Smithsonian Institution in Washington.

Casts of bones scattered throughout the world will be made to give the Institution a complete collection of existing specimens. This will enable scholars to study the skulls and other bones without traveling to many different places or relying on the descriptions made by other scientists.

The casts will also give an accurate copy in event of loss of an original specimen. This has happened in the case of the skulls of China man, which disappeared from Peiping during the war and are believed to have been lost at sea. Casts of the skulls of China man were made before the war and are in the Smithsonian collection.

Science News Letter, September 4, 1948

CHEMISTRY

Storage System Process Preserves Cottage Cheese

➤ COTTAGE CHEESE that looks like and tastes like freshly-made cheese after months of storage in a frozen condition is promised by a new process for which a government patent has been issued.

Ordinarily when cottage cheese made in the season of peak production is frozen for use later in the season of low production, it comes out with a chalky, crumbly structure and a mealy, mushy consistency. In the new process the thawed cheese has the firm body and the soft texture of fresh cheese.

In this method the curd is set with a coagulating enzyme, such as rennet or pepsin or a mixture of the two, cutting the curd when the whey acidity is between 0.25% and 0.45%, and cooking the curd to produce a rubbery, tough body. This is then frozen to break down the rubbery, tough body. When thawed the cheese is ready for immediate consumption, and consumers will never know that it has been frozen.

Patent 2,446,550 was granted for this cottage cheese preservation process to Gerald C. North and Lawrence Little, Chicago, Ill. They have assigned the patent to Beatrice Creamery Company of the same city.

Science News Letter, September 4, 1948

Science Service Radio

➤ LISTEN in to a discussion on new discoveries in biology on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Sept. 11. Watson Davis, director of Science Service, will have as his guests Dr. Ralph Cleland, chairman of the American Institute of Biological Sciences, and Dr. Raymund L. Zwemer, Executive Secretary of the National Academy of Sciences. They will give reports of the convention of the ten Biological Societies, which are meeting in cooperation with the American Institute of Biological Sciences, and a preview of the centennial meeting of the American Association for the Advancement of Science, which will meet the following week.

Science News Letter, September 4, 1948

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⚙ *LEMON SQUEEZER, for use at the table to add juice to fish or other foods, is a gravy-boat-shaped transparent plastic pitcher with a hinged top under which a quarter-lemon may be placed. When the two handles are brought together the lemon is squeezed and the juice strained in one operation.*

Science News Letter, September 4, 1948

⚙ *PLASTIC COMPASS, ruler, protractor and T-square in the same unit has one end equipped with a magnifying plastic button which permits accuracy when placing over a point to serve as a circle center. One edge of the device has pencil-point holes for making circles of five-eighths to six inches in diameter.*

Science News Letter, September 4, 1948

⚙ *TOY WATERWAYS, for boys and their dads, are sectional plastic canals for tiny boats or plastic ducks. They may be purchased with plastic circulating pumps to supply currents to move motorless boats, or without it self-propelled boats are used. Raising and lowering locks are furnished if wanted.*

Science News Letter, September 4, 1948

⚙ *METHOD OF CLASSIFYING information and then finding it again uses a random number code. Half a dozen different subjects can be listed on each card by notches and then combinations of these subjects can be searched for by a sorting box. Complex or simple chemicals used in research can be classified and searched for new and special uses.*

Science News Letter, September 4, 1948

⚙ *ELECTRO-MECHANICAL recorder, installed inside coin vending machines, gives a printed coin count against drinks and other products dispensed. In addition, it provides a continuous, permanent, legibly printed record for accounting and other departments, with nine duplicates if desired.*

Science News Letter, September 4, 1948

⚙ *AIR-PRESSURE DEVICE, to transfer with safety a liquid from one container to another, as from an oil-can to a camp stove, is a two-holed plug to fit the original container with an air-pumping tube with a bulb on its end and a delivery tube. The latter extends to near the bottom of the original container.*

Science News Letter, September 4, 1948

⚙ *NYLON-COATED WIRE rope is made in sizes suitable for uses ranging from carriage-returns on typewriters to steam-shovel cables. The ropes operate at high or low temperatures, are flexible when wet or dry, and the nylon coating protects the wire and is itself unaffected by oils, cleansing agents, marine growths and alkalies.*

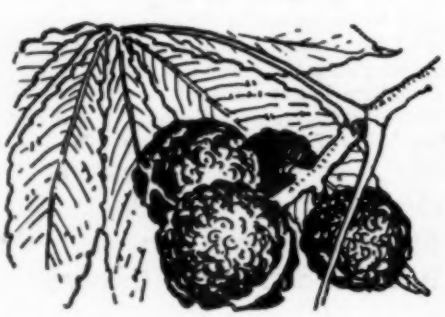
Science News Letter, September 4, 1948

• Nature Ramblings *by Frank Thone* •

➤ GENERATIONS of American school children have learned to recite Longfellow's immortal poem about the village blacksmith shop that stood under a spreading chestnut tree. Most of them, it is safe to guess, have taken the tree's name at its face value. They have thought of it as a large specimen of the now almost extinct species *Castanea dentata,* once producer of the tastiest edible chestnuts in the world but virtually wiped out during the present century by the deadly blight fungus.

Alas for the easy assumptions of youth! Longfellow's "spreading chestnut tree" was not a chestnut at all, but a horse-chestnut, belonging to the quite different genus, Aesculus. The chair made for Longfellow out of some of its wood, when it was felled years after he wrote the poem, is still preserved in the Longfellow House in Cambridge, along with other specimens from the same tree. They are all unmistakable horse-chestnut wood, not true chestnut.

Longfellow's Chestnut Tree



When you come to think of it, however, it is not at all remarkable that Longfellow should have applied the name in the way he did. He had got much of his education abroad, in lands where the horse-chestnut was, and still is, a favorite for street and park planting. The beauty of Paris in spring, for example, which has inspired many a poet since Longfellow's time, is due in part to the blossoming of the lovely candelabrum-like flower-clusters of its many horse-chestnut trees. And since the horse-chestnut is often called simple "chestnut" in the colloquial speech of many Europeans, it is only natural that Longfellow should have picked up the usage in that way.

The horse-chestnut usually planted, known botanically as *Aesculus Hippocastanum,* is not native to this continent, but was brought here from Europe. There are several species in the same genus that are native Americans, found mainly in the originally forested area east of the Mississippi; these are usually known by the folk-name of buckeye.

Science News Letter, September 4, 1948